AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-8.   (canceled)

9.   **(new)** A method for motion estimation using adaptive patterns in a video sequence compression system, said method comprising the steps of:

(a)   defining, by a motion estimation apparatus, an initial search pattern located at a center of a search window in a block of a video frame;

(b)   searching, by the motion estimation apparatus, for a location of a minimum block distortion measure (BDM) in the initial search pattern;

(c)   based on the location of the minimum BDM in the initial search pattern or a current search pattern, determining, by the motion estimation apparatus, whether a horizontal search pattern, which is elongated in a horizontal direction of the search window, or a vertical search pattern, which is elongated in a vertical direction of the search window, is to be used as a subsequent search pattern;

(d)   defining, by the motion estimation apparatus, the subsequent search pattern in the search window, wherein the subsequent search pattern is the horizontal or vertical search pattern as determined in step (c) and wherein the minimum BDM of the initial or current search pattern is positioned at one among a plurality of central locations of the subsequent search pattern;

(e)   searching, by the motion estimation apparatus, for a location of a minimum BDM in the subsequent search pattern defined in step (d);

(f)   repeating, by the motion estimation apparatus, steps (c)-(e) until the location of the minimum BDM of the subsequent search pattern falls in one of the central locations thereof;

(g)   designating, by the motion estimation apparatus, the locations of the minimum BDMs found in steps (b) and (e) as motion vectors; and

(h)   outputting, by the motion estimation apparatus, the motion vectors from said motion estimation apparatus.

10.   **(new)** The method of claim 9, wherein

the central locations of each of the horizontal and vertical search patterns comprise first and second central location; and

the horizontal search pattern further comprises, besides the respective central locations, first through fourth peripheral locations, wherein

if the minimum BDM falls on the first peripheral location, said first peripheral location will become the first central location of the subsequent, horizontal search pattern,

if the minimum BDM falls on the second peripheral location, said second peripheral location will become the second central location of the subsequent, horizontal search pattern,

if the minimum BDM falls on the third peripheral location, said third peripheral location will become the first central location of the subsequent, vertical search pattern, and

if the minimum BDM falls on the fourth peripheral location, said fourth peripheral location will become the second central location of the subsequent, vertical search pattern.

11.   **(new)** The method of claim 9, wherein the locations that belong to both the current and subsequent search patterns are excluded in the determination of the minimum BDM of the subsequent search pattern.

12.   **(new)** The method of claim 9, wherein

the initial search pattern includes 4n+1 search locations comprising

a single central location, and

2n locations in each of the vertical and the horizontal directions from said central location;

the horizontal search pattern is hexagonal and includes 8n search locations comprising

2n locations in a top row,

4n locations in a middle row, and

2n locations in a bottom row; and

the vertical search pattern is hexagonal and includes 8n search locations comprising

2n locations in a left side column,

4n locations in a middle column, and

2n locations in a right side column;

where n is a positive integer.

13.   (new) The method of claim 12, wherein

the vertical search pattern is to be used as the subsequent search pattern in case the minimum BDM of the initial search pattern occurs at one of the 2n search locations in each of the top and bottom rows;

the horizontal search pattern is to be used as the subsequent search pattern in case the minimum BDM of the initial search pattern is found at one of the 2n search locations in each of the left and right side columns; and

the search process ends in case the minimum BDM of the initial search pattern corresponds to the central location.

14.   (new) The method of claim 13, wherein, when the current search pattern is the horizontal search pattern,

the search process ends in case the minimum BDM occurs at one of 2n central locations the middle row;

the horizontal search pattern is determined to be used again as the subsequent search pattern in case the minimum BDM is found at one of the 2n search locations of the middle row on either side of the 2n central locations; and

the vertical search pattern is determined to be used as the subsequent search pattern in case the minimum BDM is at one of the 4n search locations in the top and bottom rows.

15.   (new) The method of claim 14, wherein, when the current search pattern is the vertical search pattern,

the search process ends in case the minimum BDM occurs at one of 2n central locations in the middle column;

the vertical search pattern is determined to be used again as the subsequent search pattern in case the minimum BDM is found at one of the 2n search locations of the middle column above or below the 2n central locations; and

the horizontal search pattern is determined to be used as the subsequent search pattern in case the minimum BDM is at one of the 4n search locations in the left and right columns.

16.   (new) An apparatus for motion estimation using adaptive search patterns for a video sequence compression, said apparatus comprising:

a current image block generation unit for generating a current image block;

a previous image block generation unit for generating a previous image block;

first and second memories for storing the image blocks generated by the current image block generation unit and the previous image block generation unit; and

a pattern determination and motion estimation unit for retrieving data of image block stored in the first and the second memory for performing the following steps:

(a)   defining an initial search pattern located at a center of a search window in a block of a video frame;

(b)   searching for a location of a minimum block distortion measure (BDM) in the initial

5

search pattern;

(c) based on the location of the minimum BDM in the initial search pattern or a current search pattern, determining whether a horizontal search pattern, which is elongated in a horizontal direction of the search window, or a vertical search pattern, which is elongated in a vertical direction of the search window, is to be used as a subsequent search pattern;

(d) defining the subsequent search pattern in the search window, wherein the subsequent search pattern is the horizontal or vertical search pattern as determined in step (c) and wherein the minimum BDM of the initial or current search pattern is positioned at one among a plurality of central locations of the subsequent search pattern;

(e) searching for a location of a minimum BDM in the subsequent search pattern defined in step (d);

(f) repeating steps (c)-(e) until the location of the minimum BDM of the subsequent search pattern falls in one of the central locations thereof;

(g) designating the locations of the minimum BDMs found in steps (b) and (e) as motion vectors; and

(h) outputting the motion vectors from said motion estimation apparatus.